The relationship between accelerometer and GPS derived data in elite men's hockey competition

Published in:
Journal of Sports Sciences

Publication Status:
Published (in print/issue): 15/11/2016

DOI:
10.1080/02640414.2016.1260807

Document Version
Publisher's PDF, also known as Version of record

flaws during the TJA and to determine inter-rater agreement for each criterion and the composite score. Following institutional ethical approval, 60 female soccer players were recruited from one international squad (mean (SD): age = 20.27 ± 3.44 years; height = 168.02 ± 5.26 cm; mass = 62.54 ± 6.33 kg). Video recordings (sagittal and coronal plane) of each player undertaking the TJA on an artificial 4G playing surface were taken. Four raters (2 physiotherapists and 2 strength and conditioning coaches) independently assessed each TJA criterion *post hoc* (flaw present = 1 point, flaw absent = 0 points) and the composite score calculated for each player. There were 665 technique flaws. Criterion 2 "Thighs do not reach parallel" was most common (N = 147/665), followed by criterion 1 "Knee valgus on landing" (N = 80/665). Criterion 9 "Pause between jumps" was least common (N = 23/665).The most common fault category was "Knee and thigh motion" (N = 234/720, 32.5% composite of 3 criteria weighted for maximum possible faults). There were clinically acceptable levels of agreement between raters for "Lower extremity valgus at landing", k = .83 (95% CI, .72–.93); "Thighs do not reach parallel (peak of jump)", k = .84 (95% CI, .74–.94); "Thighs not equal side to side", k = .86 (95% CI, .75–.96). The level of agreement for the composite score of all 10 criteria ranged from kw = .62 (95% CI, .48–.76) to kw = .80 (95% CI, .70–.90) suggesting a "fair-to-very good" level of inter-rater agreement. The "knee and thigh" motion category of the TJA may provide the most useful information for knee mechanics and potential risk factors for knee injury. We recommend its use for screening elite female soccer players.

D1.P43. The relationship between accelerometer and GPS-derived data in elite men's hockey competition

RODNEY KENNEDY[1]*, OWEN MAGEE[1] & GERARD MCMAHON[2]

[1]*Ulster University and* [2]*Sports Institute Northern Ireland*
*Corresponding author: r.kennedy@ulster.ac.uk

The advancements in micro-technology have enabled the quantification of external load in many team sports using GPS-derived data. However, it has been proposed that an accelerometer-derived variable, such as player load (PL), may provide a superior measurement system (Boyd, Ball, & Aughey, 2011, *International Journal of Sports Physiology and Performance*, *6*, 311–321). The aim of this study was to examine the relationship between PL and distance covered in hockey competition. With institutional ethics approval, 25 elite male hockey players wore tracking devices in 8 international matches. Players were classified into 3 positional groups (defenders, midfielders and forwards). Absolute and relative values were determined for PL and distance. The Pearson product-moment correlation coefficient (r) was calculated to determine the relationship between PL and distance. The Fisher Z test was used to compare the relationships between groups. There were very large correlations between absolute distance and load for all positions (r = 0.902–0.956, $P < 0.01$) and overall ($r = 0.910$, $P < 0.01$). The absolute distance to load relationship was not different between positions. There were very large correlations between relative distance and load for all positions (r = 0.702–0.927, $P < 0.01$) and overall ($r = 0.872$, $P < 0.01$). The relative distance to load relationship was weaker in defenders compared with midfielders (Z = 3.48, P = 0.0005) and forwards (Z = 2.14, P = 0.0324). The strong relationships between these variables suggest that PL is simply a proxy for distance covered and it appears to be heavily influenced by the vertical accelerations that occur during foot strike at any running speed. Therefore, additional research is required to examine how PL can be modified to fully represent all hockey-specific activities. The numerical spread of data may have influenced the positional relationships for the relative values.

D1.P44. The effect of generalised joint hypermobility on rate, risk and frequency of injury in male university-level rugby league players. A prospective cohort study

CASSIE ODDY[1,2]*, MARK JOHNSON[1,3], RAYMOND HEALY[2] & GARETH JONES[1,3]

[1]*Leeds Beckett University*, [2]*University of Salford and* [3]*Leeds Pallium Research Group*
*Corresponding author: c.oddy@leedsbeckett.ac.uk

Generalised joint hypermobility (GJH) describes hypermobility in the absence of musculoskeletal pain and rheumatological disease (Simpson, 2006, *Journal of the American Osteopathic Association*, *106*, 531–536). Rugby league is a collision sport with a high incidence of musculoskeletal injuries (Gabbett, 2002, *British Journal of Sports Medicine*, *36*, 23–26). This study prospectively investigates hypermobility as a risk factor for injury in 45 male rugby league players from one university in the 2013–2014 season (mean ± standard deviation age = 20.93 ± 1.57 years). GJH was determined pre-season using the Beighton scale, GJH = > 4 out of 9 points (Remvig, Jensen, & Ward, 2007, *Journal of Rheumatology*, *34*, 798–803) and individual weekly exposure recorded in minutes during training and match play throughout the season. Injuries were assessed by a physiotherapist with severity categorised according to a time loss from rugby as slight (0 days), minimal (1–3 days), mild (4–7 days), moderate (8–28 days) and severe (>28 days). Comparisons between hypermobile and non-hypermobile participants were analysed for demographic, anthropometric, injury and exposure data (alpha $P < .05$). The prevalence of hypermobility was 20% (9/45 participants) with no statistically significant differences between hypermobile and non-hypermobile participants in age, height, weight, BMI, total exposure, training exposure and match exposure. A total of 33 injuries were recorded during the season (15 = contact injuries, most common sites = ankle [33%] and knee [30%]). Twenty-six injuries were "mild" in severity, 5 were "moderate" and 2 were "severe" with no statistically significant differences between hypermobile and non-hypermobile groups. Twenty-three participants sustained at least 1 injury (4 = hypermobile [8 injuries], 19 = non-hypermobile [25 injuries]). Mann–Whitney U tests indicated no differences in the frequency of injuries (P = 0.938), mean incidence rate per 1000 h of total injuries (P = 0.821), training injuries (P = 0.523) or match injuries (P = 0.678) between hypermobile and non-hypermobile participants. Hypermobile participants did not demonstrate a greater tendency to experience injury (Fisher exact test, P = 0.722), or demonstrate a greater risk of injury (odds ratio = 0.716, 95% CI, 0.165–3.109; relative risk = 0.842, 95% CI, 0.381–1.861). No hypermobile participant sustained an